



Storage Ring Monopulse RF BPM Upgrade Project # 67

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Storage Ring RFBPM Upgrade

- **Objective** – Upgrade RFBPM data acquisition electronics on 8 BPMs to prove design before investing in production quantities.
- **Background Information**
 - Multi-year project with expected completion date FY07
 - Existing feasibility task started FY04
 - High Priority
- **Justification**– This upgrade will provide a reliable turn-to-turn beam history to facilitate post-mortem beam loss analysis. It will also improve beam stability and reliability which will revitalize this system for another decade of operation.

Storage Ring RFBPM Upgrade

- **Consequence**

- Presently some beam dumps cannot be analyzed because of inoperative beam history modules.
- The maintenance of the existing system has become expensive because many of the parts are obsolete.
- Problems only get worse until the data acquisition electronics are replaced.

- **Cost**

- Phase 1 Feasibility study (1 year 2004) Cost = \$50k + labor
- Phase 2 First Article (FY 2005) Non-effort cost = \$150k + effort
\$685k
- Phase 3 Production (1.5 years) Cost = engineering estimate < \$500k

RFBPMs Are Critical To Operations

- The RFBPMs are central to the real-time feedback system, which we use to keep the beam stability at the 1-2 micron rms level.
- We rely on this system to provide turn-by-turn post-mortem capability for accurate storage ring fault analysis and remediation.
- Turn-by-turn is also essential for characterization of the machine to cure beam instabilities that may arise in new operating modes, for example higher current.
- Updated data acquisition will directly translate into improved beam stability. Modern technology will allow a vast improvement in performance and capabilities.
- Upgrade reduces the overall system parts count which improves system reliability.

FY05 First Article Deliverables

- The First Article units will consist of two eight-channel data acquisition VXI boards to instrument one sector. This replaces ten original VXI boards for the same/improved functionality.
- Receiver interface module and crate hardware.
- Reliable fast beam history data.
- New self-test capabilities.
- New oscilloscope fast position measurement capability.
- Improved beam position resolution.

Questions

